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| PRE-APPEAL BRIEF REQUEST FOR REVIEW | | Docket Number (Optional) TSM02-0936 |
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| <p>I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)]</p> <p>on _____</p> <p>Signature _____</p> <p>Typed or printed name _____</p> | <p>Application Number 10/649,310</p> <hr/> <p>First Named Inventor</p> <hr/> <p>Art Unit 1795</p> | <p>Filed August 27, 2003</p> <hr/> <p>Examiner Ruggles, John S.</p> |
| <p>Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.</p> <p style="margin-top: 20px;">This request is being filed with a notice of appeal.</p> <p style="margin-top: 20px;">The review is requested for the reason(s) stated on the attached sheet(s). Note: No more than five (5) pages may be provided.</p> <p style="margin-top: 20px;">I am the</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><input type="checkbox"/> applicant/inventor.</p> <p><input type="checkbox"/> assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)</p> <p><input checked="" type="checkbox"/> attorney or agent of record. Registration number <u>41,992</u></p> <p><input type="checkbox"/> attorney or agent acting under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34. _____</p> </div> <div style="width: 45%;"> <p>_____ Signature</p> <p><u>Thomas J. Meaney</u> Typed or printed name</p> <p>_____ 972-732-1001 Telephone number</p> <p>_____ December 31, 2007 Date</p> </div> </div> <p>NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.</p> | | |
| <p><input checked="" type="checkbox"/> *Total of <u>1</u> forms are submitted.</p> | | |

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Lin Docket No.: TSM02-0936
Serial No.: 10/649,310 Art Unit: 1795
Filed: August 27, 2003 Examiner: Ruggles, John S.
For: Methods of Making Attenuated Phase-Shifting Masks from Mask Blanks

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PRE-APPEAL BRIEF REQUEST FOR REVIEW

Dear Sir:

The following Pre-Appeal Brief is submitted for review by a Panel of Examiners ("the Panel"). Independent claims 40 and 53 are the subject of this pre-appeal request. Applicants reserve the right to further argue other claims in an appeal brief.

1. Issues

The following issue summarizes the improper rejections asserted by the Examiner in the Final Office Action dated October 29, 2007 and is the subject of this pre-appeal brief.

(a) Whether the various multiple and optional combinations of *Tanaka*, *Hasegawa*, *Itoh*, *Dove*, *Mitsui*, and/or *Chen* teach, at least, patterning and adapting a prefabricated mask blank designed for use with a first wavelength in an adapted-patterned mask for use with a second light wavelength that is shorter than the first wavelength.

2. Discussion

Claims 40 and 44-50 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *Doi et al.* (U.S. Patent No. 5,527,647, hereinafter "*Doi*"), in view of *Tanaka et al.* (U.S. Patent Publication No. 2002/0022184, hereinafter "*Tanaka*") and either *Hasegawa et al.* (U.S. Patent No. 6,677,107, hereinafter "*Hasegawa*") or *Itoh* (U.S. Patent Publication No. 2003/0184721, hereinafter "*Itoh*"), further in view of either *Dove et al.* (U.S. Patent No. 5,939,225, hereinafter "*Dove*") or *Mitsui et al.* (U.S. Patent No. 6,242,138, hereinafter "*Mitsui*"), and further in view of *Chen* (U.S. Patent No. 6,274,281, hereinafter "*Chen*").

Claim 40, as amended, requires:

[O]btaining a prefabricated mask blank designed for use with a light of a first wavelength λ_0 , the prefabricated mask blank comprising:

- a transparent layer, and
- an attenuating and phase-shifting layer (attPS layer) formed on the transparent layer, the attPS layer having an initial attPS-layer thickness D_0 , and

- patterning and adapting the prefabricated mask blank to be an adapted-patterned mask for use with light of a second wavelength λ_1 , ... the patterning and adapting comprising:

- reducing the attPS-layer thickness of the attPS layer to a first attPS-layer thickness D_1 at dark areas, and
- patterning and etching the attPS layer to form the clear areas

....

Thus, claim 40 requires beginning with a prefabricated mask blank that already has a transparent layer and an attPS layer where the blank is designed for use with a first wavelength. This prefabricated mask blank is then patterned and adapted for use with a different wavelength by reducing the thickness of the attPS at some locations of the dark areas, and patterning and etching the attPS at other areas to form the clear areas.

In cobbling together his rejection with bits and pieces of various relevancy from seven different patents and published applications, the Examiner attempts to show a *prima facie* case of obviousness of the invention described in claim 40. However, regardless of the various bits and pieces of the seven references that the Examiner has cited to, their combination does not even teach or suggest all of the claim limitations required in claim 40.

The Examiner admits that *Doi* does not teach: (1) an initial thickness D_0 of the attPS layer that is suitable for a first wavelength of which thinning would provide an attPS layer suitable for a second, smaller/shorter wavelength; (2) that the second thickness D_3 remains at the clear areas of the attPS, where D_3 is less than the previous thickness, D_1 ; and (3) that the initial thickness of the attPS is actually on a prefabricated mask blank. Office Action, p. 5. In order to cure these multiple deficiencies in *Doi*, the Examiner offers various multiple and optional combinations of *Tanaka*, *Hasegawa*, *Itoh*, *Dove*, *Mitsui*, and/or *Chen*. Office Action, pp. 5-10.

In response to deficiency (3), the Examiner offers either *Hasegawa* or *Itoh* to show that it is known for a prefabricated mask blank and a resulting patterned mask to be fabricated separately

and, sometimes, by different companies or locations. Office Action, p. 5. Applicant would note, however, that the language of claim 40 does not require the prefabricated mask blank being fabricated separately or by a different company. Applicant agrees that it is well known that prefabricated mask blanks may be made by various different entities, including the same mask/chip manufacturer, and may be made at different times or locations than the final patterned mask. Thus, the proffered teachings of *Hasegawa* and *Itoh* are irrelevant to the patentability of claim 40.

The Examiner next offers *Tanaka* to teach various different examples of the relationships between mask manufactures, blank manufacturers, mask reclaiming, and the like. Office Action, pp. 5-6. The Examiner also offers *Tanaka* and *Dove* to provide explanation of the science behind attenuated phase-shifting masks. Office Action, p. 6. The sum of the science recited by the Examiner is that a thicker attenuation layer accommodates a longer/larger wavelength than a thinner attenuation layer. The Examiner concludes that:

it has been known for some time that an attPS layer at a first thickness (analogous to instant initial thickness D_0) that is suitable for a desired transmittance (e.g., $T = 5\%$ to 15%, etc.) at a first wavelength (analogous to instant λ_0) *could be made suitable* for the same desired transmittance at a second wavelength (analogous to instant λ_1) that is shorter than the first wavelength (reading on $\lambda_1 < \lambda_0$) by simply reducing the thickness of the attPS layer, *as taught by Dove et al.* Office Action, p. 6. (citations omitted) (emphasis added).

Thus, the Examiner asserts that *Dove* teaches reducing the thickness of a blank that is suitable for a first wavelength in order to make is suitable for handing a second shorter wavelength. However, on inspection of *Dove*, *Dove* does not, in fact, teach this limitation, as claimed by the Examiner. *Dove* involves the thin film materials use in preparation of attenuating phase shift masks. Title, Specification, Col. 1, lns 15-41. It does not consider or discuss mask reclamation or refurbishment of such masks. Therefore, there is no discussion or suggestion of changing the mask from one thickness intended for a first wavelength into another thickness intended for a second, smaller wavelength. Instead, *Dove* describes experimental results that indicate what transmission characteristics exists for the inventive films based on different thicknesses. Therefore, at most, *Dove* supports the science that thicker attenuation layers are suitable for longer wavelengths.

Neither claim 40, nor the claimed invention in general, attempts to patent the scientific principal that thicker attenuation layers are suitable for longer wavelengths than thinner attenuation

layers. As such, *Dove* does not, as the Examiner suggested, support the teaching and limitations of claim 40. Accordingly, the combined teachings of *Doi*, *Tanaka*, *Hasegawa*, *Itoh*, *Dove*, *Mitsui*, and/or *Chen* do not teach or suggest each and every limitation of claim 40.

Similar to *Dove*, *Mitsui* also does not consider or discuss mask reclamation or refurbishment of masks and mask blanks. Therefore, there is no discussion or suggestion of changing the mask from one thickness intended for a first wavelength into another thickness intended for a second, smaller wavelength. Instead, as in *Dove*, *Mitsui* supports the science behind thicker attenuation layers supporting longer wavelength light than thinner layers.

Tanaka, on the other hand, is the only reference out of the references cited by the Examiner that discusses mask blank reclamation in any manner. As noted by the Examiner, *Tanaka* gives several examples of the different types of businesses involved in mask blank manufacturing and reclamation, as well as the typical scenarios that involve these various types of businesses. At most, *Tanaka* describes in each scenario how original masks that either do not meet defect inspection or that are used, are then completely stripped before reclamation (whether the stripping is performed at the mask user company, the mask manufacturer, or the mask reclaiming company. Again, as in *Dove* and *Mitsui*, *Tanaka* provides additional support for the science of the relationship between thickness and wavelength. However, while *Tanaka* clearly recites this scientific relationship, there is no teaching or suggestion that the attenuation layers of the masks are modified in parts to accommodate a different wavelength. Thus, there is no teaching or suggestion that would support a *prima facie* case of obviousness in combination with *Doi*, *Hasegawa*, *Itoh*, *Dove*, *Mitsui*, and/or *Chen*. Accordingly, claim 40 is allowable for at least the reasons discussed above. Applicant, therefore, respectfully requests that the rejection of claim 40 be overruled.

Claims 44-50 depend from claim 40 and inherit all of the limitations of claim 40. Accordingly, claims 44-50 are allowable for at least the reasons discussed above. Applicant, therefore, respectfully requests that the rejections of claims 44-50 likewise be overruled.

Claims 42-43, which the Examiner rejected under 35 U.S.C. § 103(a) over *Doi*, in view of *Tanaka* and with *Hasegawa* or *Itoh*, further in view of either *Dove* or *Mitsui*, further in view of *Chen* and further in view of *Jin*, depend from claim 40 and inherit all of the limitations of claim 40.

Accordingly, claims 42-43 are also allowable for at least the reasons discussed above. Applicant, therefore, respectfully requests that the rejections of claims 42-43 likewise be overruled.

Claim 53, which the Examiner also rejected under 35 U.S.C. § 103(a) over *Doi*, in view of *Tanaka* and with *Hasegawa* or *Itoh*, further in view of either *Dove* or *Mitsui*, further in view of *Chen* and further in view of *Jin*, is patentable over the asserted combinations for the same reasons as argued with respect to claim 40. Applicant, therefore, respectfully requests that the rejections of claim 53 likewise be overruled.

Please refer to Applicant's Response Under 37 CFR § 1.116, dated September 13, 2007, for further arguments if necessary.

Respectfully submitted,

12/31/07
Date

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